

# Rock Mechanics And Engineering

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**Rock Mechanics and Rock Engineering** - mer Aydan 2019-12-16

V. 1. Fundamentals of rock mechanics -- v. 2. Applications of rock mechanics - rock en.

Petroleum Rock Mechanics - Bernt Aadnoy 2019-06-15

Petroleum Rock Mechanics: Drilling Operations and Well Design, Second Edition, keeps petroleum and drilling engineers centrally focused on the basic fundamentals surrounding geomechanics, while also keeping them up-to-speed on the latest issues and practical problems. Updated with new chapters on operations surrounding shale oil, shale gas, and hydraulic fracturing, and with new sections on in-situ stress, drilling design of optimal mud weight, and wellbore instability analysis, this book is an ideal resource. By creating a link between theory with practical problems, this updated edition continues to provide the most recent research and fundamentals critical to today's drilling operations. Helps readers grasp the techniques needed to analyze and solve drilling challenges, in particular wellbore instability analysis Teaches rock mechanic fundamentals and presents new concepts surrounding sand production and hydraulic fracturing operations Includes new case studies and sample problems to practice

**Rock Mechanics and Engineering** - Charles Jaeger 1972

*Petroleum Related Rock Mechanics* - Erling Fjar 2008-01-04

Engineers and geologists in the petroleum industry will find Petroleum Related Rock Mechanics, 2e, a powerful resource in providing a basis of rock mechanical knowledge - a knowledge which can greatly assist in the understanding of field behavior, design of test programs and the design of field operations. Not only does this text give an introduction to applications of rock mechanics within the petroleum industry, it has a strong focus on basics, drilling, production and reservoir engineering. Assessment of rock mechanical parameters is covered in depth, as is acoustic wave propagation in rocks, with possible link to 4D seismics as well as log interpretation. Learn the basic principles behind rock mechanics from leading academic and industry experts Quick reference and guide for engineers and geologists working in the field Keep informed and up to date on all the latest methods and fundamental concepts

*Rock Engineering Systems* - John A. Hudson 1992

This book provides a new and much-needed systems approach to all rock engineering problems. The methodology has application to any structures built on or in rock, and hence will be of major interest to everyone involved in the subject - engineers, researchers, students and teachers. the author explains from first principles how this new and original methodology is developed. The subjects encompass a unique atlas of rock engineering mechanisms, a method of establishing the importance of each parameter and mechanism in any rock engineering project, the energy and entropy contexts, how to implement the approach in engineering practice, and all the benefits accruing from systems thinking - with examples ranging from assessing candidate schemes to systems auditing of rock engineering projects.

*Rock Mechanics Through Project-Based Learning* - Ivan Gratchev 2019-10-23

Traditional textbooks on rock mechanics often fail to engage students in the learning process as such books are packed with theory that students are unlikely to use in their future employment. In contrast, this book delivers the fundamentals of rock mechanics using a more practical and engaging project-based approach which simulates what practitioners do in their real-life practice. This book will be of great help to those who

would like to learn practical aspects of rock mechanics and better understand how to apply theory to solve real engineering problems. This book covers geology, rock mechanics principles, and practical applications such as rock falls, slope stability analysis and engineering problems in tunnels. Throughout the whole book, the reader is engaged in project-based work so that the reader can experience what rock mechanics is like and clearly see why it is an important part of geotechnical engineering. The project utilizes real field and laboratory data while the relevant theory needed to execute the project is linked to each project task. In addition, each section of the book contains several exercises and quiz questions to scaffold learning. Some problems include open-ended questions to encourage the reader to exercise their judgement and develop practical skills. To foster the learning process, solutions to all questions are provided to allow for learning feedback.

Rock Mechanics for Natural Resources and Infrastructure Development - Full Papers - Sergio A.B. da Fontoura 2019-09-03

Rock Mechanics for Natural Resources and Infrastructure Development contains the proceedings of the 14th ISRM International Congress (ISRM 2019, Foz do Iguaçu, Brazil, 13-19 September 2019). Starting in 1966 in Lisbon, Portugal, the International Society for Rock Mechanics and Rock Engineering (ISRM) holds its Congress every four years. At this 14th occasion, the Congress brings together researchers, professors, engineers and students around contemporary themes relevant to rock mechanics and rock engineering. Rock Mechanics for Natural Resources and Infrastructure Development contains 7 Keynote Lectures and 449 papers in ten chapters, covering topics ranging from fundamental research in rock mechanics, laboratory and experimental field studies, and petroleum, mining and civil engineering applications. Also included are the prestigious ISRM Award Lectures, the Leopold Muller Award Lecture by professor Peter K. Kaiser. and the Manuel Rocha Award Lecture by Dr. Quinghua Lei. Rock Mechanics for Natural Resources and Infrastructure Development is a must-read for academics, engineers and students involved in rock mechanics and engineering. Proceedings in Earth and geosciences - Volume 6 The 'Proceedings in Earth and geosciences' series contains proceedings of peer-reviewed international conferences dealing in earth and geosciences. The main topics covered by the series include: geotechnical engineering, underground construction, mining, rock mechanics, soil mechanics and hydrogeology.

**Rock Mechanics** - Nagaratnam Sivakugan 2013-01-18

Rock mechanics is a multidisciplinary subject combining geology, geophysics, and engineering and applying the principles of mechanics to study the engineering behavior of the rock mass. With wide application, a solid grasp of this topic is invaluable to anyone studying or working in civil, mining, petroleum, and geological engineering. Rock Mechani

Soft Rock Mechanics and Engineering - Milton Kanji 2019-11-24

This book offers a practical reference guide to soft rock mechanics for engineers and scientists. Written by recognized experts, it will benefit professionals, contractors, academics, researchers and students working on rock engineering projects in the fields of civil engineering, mining and construction engineering. Soft Rock Mechanics and Engineering covers a specific subject of great relevance in Rock Mechanics - and one that is directly connected to the design of geotechnical structures under difficult ground conditions. The book addresses practical issues related to the geomechanical properties of these types of rock masses and

their characterization, while also discussing advances regarding in situ investigation, safety, and monitoring of geotechnical structures in soft rocks. Lastly, it presents important case histories involving tunnelling, dam foundations, coal and open pit mines and landslides.

Industrial Communication Technology Handbook, Second Edition - Richard Zurawski 2014-11-07

Featuring contributions from major technology vendors, industry consortia, and government and private research establishments, the Industrial Communication Technology Handbook, Second Edition provides comprehensive and authoritative coverage of wire- and wireless-based specialized communication networks used in plant and factory automation, automotive applications, avionics, building automation, energy and power systems, train applications, and more. New to the Second Edition: 46 brand-new chapters and 21 substantially revised chapters Inclusion of the latest, most significant developments in specialized communication technologies and systems Addition of new application domains for specialized networks The Industrial Communication Technology Handbook, Second Edition supplies readers with a thorough understanding of the application-specific requirements for communication services and their supporting technologies. It is useful to a broad spectrum of professionals involved in the conception, design, development, standardization, and use of specialized communication networks as well as academic institutions engaged in engineering education and vocational training.

Rock Mechanics: Achievements and Ambitions - Meifeng Cai 2011-09-22

Rock Mechanics: Achievements and Ambitions contains the papers accepted for the 2nd ISRM International Young Scholars' Symposium on Rock Mechanics, which was sponsored by the ISRM and held on 14-16 October 2011 in Beijing, China, immediately preceding the 12th ISRM Congress on Rock Mechanics. Highlighting the work of young teachers, researchers and practitioners, the present work provides an important stimulus for the next generation of rock engineers, because in the future there will be more emphasis on the use of the Earth's resources and their sustainability, and more accountability of engineers' decisions. In this context, it is entirely appropriate that the Symposium venue for the young scholars was in China — because of the rock mechanics related work that is anticipated in the future. For example, in the Chinese Academy of Sciences report, "Energy Science and Technology in China: A Roadmap to 2050", it is predicted that China's total energy demand will reach 31, 45, 61 and 66 x 10<sup>8</sup> tce (tonnes of coal equivalent) in 2010, 2020, 2035, 2050. The associated per capita energy consumption for the same years is estimated at 2.3, 3.1, 4.1 and 4.6 tce. This increasing demand will be met, inter alia, by the continued operation and development of new coal mines, hydroelectric plants and nuclear power stations with one or more underground nuclear waste repositories, all of which will be improved by more modern methods of rock engineering design developed by young scholars. In particular, enhanced methods of site investigation, rock characterisation, rock failure understanding, computer modelling, and rock excavation and support are needed. The topics in the book include contributions on: - Field investigation and observation - Rock constitutive relations and property testing - Numerical and physical modeling for rock engineering - Information technology, artificial intelligence and other advanced techniques - Underground and surface excavation and reinforcement techniques - Dynamic rock mechanics and blasting - Prediction and prevention of geo-environmental hazard - Case studies of typical rock engineering Many of the 200 papers address these topics and demonstrate the skills of the young scholars, indicating that we can be confident in the continuing development of rock mechanics and rock engineering, leading to more efficient, safer and economical structures built on and in rock masses. Rock Mechanics: Achievements and Ambitions will appeal to professionals, engineers and academics in rock mechanics, rock engineering, tunnelling, mining, earthquake engineering, rock dynamics and geotechnical engineering.

Time-Dependency in Rock Mechanics and Rock Engineering - Ömer Aydan 2017-01-06

This book is concerned with time-dependency in rock mechanics and rock engineering, whose spectrum is very wide. While the term "time-dependency" involves time-dependent behavior/rate-dependent behavior of rocks in a conventional sense, this book attempts to cover the spectrum as much as possible including coupled processes of thermal, hydrological and diffusions in rocks. It presents theoretical formulations, experiments, numerical formulation and examples of applications. Of paramount concern is the long-term response and stability of rock engineering structures, including for instance man-made and natural slopes and underground facilities such as tunnels and powerhouses.

Rock Mechanics and Rock Engineering - Ömer Aydan 2019-12-06

The two-volume set Rock Mechanics and Rock Engineering is concerned with the application of the principles of mechanics to physical, chemical and electro-magnetic processes in the upper-most layers of the earth and the design and construction of the rock structures associated with civil engineering and exploitation or extraction of natural resources in mining and petroleum engineering. Volume 2, Applications of Rock Mechanics - Rock Engineering, discusses the applications of rock mechanics to engineering structures in/on rock, rock excavation techniques and in-situ monitoring techniques, giving some specific examples. The dynamic aspects associated with the science of earthquakes and their effect on rock structures, and the characteristics of vibrations induced by machinery, blasting and impacts as well as measuring techniques are described. Furthermore, the degradation and maintenance processes in rock engineering are explained. Rock Mechanics and Rock Engineering is intended to be a fundamental resource for younger generations and newcomers and a reference book for experts specialized in Rock Mechanics and Rock Engineering and associated with the fields of mining, civil and petroleum engineering, engineering geology, and/or specialized in Geophysics and concerned with earthquake science and engineering.

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Rock Mechanics in Civil and Environmental Engineering - Jian Zhao 2010-05-19

During the last two decades rock mechanics in Europe has been undergoing some major transformation. The reduction of mining activities in Europe affects heavily on rock mechanics teaching and research at universities and institutes. At the same time, new emerging activities, notably, underground infrastructure construction, geothermal energy develop

Fractals in Rock Mechanics - Heping Xie 2020-12-18

Important developments in the progress of the theory of rock mechanics during recent years are based on fractals and damage mechanics. The concept of fractals has proved to be a useful way of describing the statistics of naturally occurring geometrics. Natural objects, from mountains and coastlines to clouds and forests, are found to have boundaries best described as fractals. Fluid flow through jointed rock masses and clusterings of earthquakes are found to follow fractal patterns in time and space. Fracturing in rocks at all scales, from the microscale (microcracks) to the continental scale (megafaults), can lead to fractal structures. The process of diagenesis and pore geometry of sedimentary rock can be quantitatively described by fractals, etc. The book is mainly concerned with these developments, as related to fractal descriptions of fragmentations, damage and fracture of rocks, rock burst, joint roughness, rock porosity and permeability, rock grain growth, rock and soil particles, shear slips, fluid flow through jointed rocks, faults, earthquake clustering, and so on. The prime concerns of the book are to give a simple account of the basic concepts, methods of fractal geometry, and their applications to rock mechanics, geology, and seismology, and also to discuss damage mechanics of rocks and its application to mining engineering. The book can be used as a textbook for graduate students, by university teachers to prepare courses and seminars, and by active scientists who want to become familiar with a fascinating new field.

Rock Mechanics - Leopold Müller 1982-02-01

Much of the research on fracture of rocks or rock-like materials conducted over the past two decades may be considered as "academic studies" of the general phenomenon of fracture. Yet, the understanding of this phenomenon is fundamental if a material is used in any engineering design, whether the aim is to prevent failure of the structure or to promote it. Fracture theories existing are generally empirical and derived from experimental results of laboratory test with simple boundary conditions. Because of the basic weakness of rock intension and because in general the environmental stresses in rock mechanics are compressive most

of these theories consider fracture under compressive stress conditions. The Coulomb-Navier-, the Mohr-, the Griffith and the McClintock and Walsh criteria are typical examples and will be considered in the following. In addition the tendency during the past was in making accurate experiments under conditions of homogeneous stresses. To obtain information about the fracture behaviour with unequal principal stresses systems have to be used which involve inhomogeneous stresses. This case is of particular interest, since in practical rock mechanics we may expect conditions of highly inhomogeneous stresses. However, a consideration of such situations involve additional assumptions like the applicability of the theory of elasticity for calculating the stress field, which may be open to question. A distinction has to be made between fracture initiation and fracture propagation, since a detailed observation of the total fracture process in rock was possible by means of "stiff" and "servo-controlled" loading systems.

#### **Rock Mechanics and Rock Engineering** - 1993

#### **Design Analysis in Rock Mechanics** - William G. Pariseau 2006-10-26

In a straightforward manner and with plenty of illustrations, this textbook approaches important design issues in rock mechanics from a mechanics of materials foundation. It addresses rock slope stability in surface excavations, shaft and tunnel stability, and entries and pillars. The book also covers three-dimensional caverns with an emphasis of b

#### **Rock Mechanics and Engineering** - Helin Fu 2020-11-25

Rock Mechanics and Engineering: Prediction and Control of Landslides and Geological Disasters presents the state-of-the-art in monitoring and forecasting geotechnical hazards during the survey and design, construction, and operation of a railway. This volume offers the latest research and practical knowledge on the regularity of disaster-causing activities, and the monitoring and forecasting of rockfalls, landslides, and debris flow induced by rainfall and human activity. The book gives guidance on how to optimize railway design, prevent and control measures during construction, and geological hazard remediation. The book also advises engineers on how to achieve traffic safety on high-speed railways. Eleven chapters present best practices in the prediction and control of landslides and rockfalls in geological disasters, derived from years of geotechnical engineering research and practice on high-speed railways in China. High-speed railways bring characteristic geotechnical challenges including a complete maintenance system, a long railway line, and the subjection of the geological body to cyclic loads. Since the damage to the geological body is influenced by fatigue as well as rock and soil strength and hydrology, the study of geotechnical hazards to high-speed rail is very complex. Monitoring and predicting such hazards on high-speed railways is a significant challenge to their safe construction and operation. Presents the latest technical achievement and development trends in landslide and rockfall forecasting Considers the challenges of high-speed railways to the prediction and control of geotechnical hazards Gives both in-situ and laboratory tests for rockfalls, and considers the collapse process of rock slopes Describes the principles of slope monitoring with specific reference to high-speed rail Details an automatic monitoring system for geotechnical hazards to high-speed rail

#### **Rock Engineering and Rock Mechanics: Structures in and on Rock Masses** - R. Alejano 2014-05-12

Rock Engineering and Rock Mechanics: Structures in and on Rock Masses covers the most important topics and state-of-the-art in the area of rock mechanics, with an emphasis on structures in and on rock masses. The 255 contributions (including 6 keynote lectures) from the 2014 ISRM European Rock Mechanics Symposium (EUROCK 2014, Vigo, Spain, 27-29 Ma

#### **Rock and Soil Mechanics** - W. Derski 2012-12-02

Although theoretical in character, this book provides a useful source of information for those dealing with practical problems relating to rock and soil mechanics - a discipline which, in the view of the authors, attempts to apply the theory of continuum to the mechanical investigation of rock and soil media. The book is in two separate parts. The first part, embodying the first three chapters, is devoted to a description of the media of interest. Chapter 1 introduces the main argument and discusses the essence of the discipline and its links with other branches of science which are concerned, on the one hand, with technical mechanics and, on the other, with the properties, origins, and formation of rock and soil strata under natural field conditions. Chapter 2 describes mechanical models of bodies useful for the purpose of the discourse and

defines the concept of the limit shear resistance of soils and rocks. Chapter 3 gives the actual properties of soils and rocks determined from experiments in laboratories and in situ. Several tests used in geotechnical engineering are described and interconnections between the physical state of rocks and soils and their rheological parameters are considered. The second part of the book considers the applications of various theories which were either first developed for descriptive purposes in continuum mechanics and then adopted in soil and rock mechanics, or were specially developed for the latter discipline. Chapter 4 discusses the application of the theory of linear viscoelasticity in solving problems of stable behaviour of rocks and soils. Chapter 5 covers the use of the groundwater flow theory as applied to several problems connected with water movement in an undeformable soil or rock skeleton. Chapter 6 is a natural expansion of the arguments put forward in the previous chapter. Here the movement of water is regarded as the cause of deformation of the rock or soil skeleton and the consolidation theory developed on this basis is presented in a novel formulation. Some new engineering solutions are also reported. The seventh chapter is devoted to the limit state theory as applied to the study of the mechanical behaviour of soils and rocks. It presents some new solutions and methods which include both static and kinematic aspects of the problem, and some original effective methods for investigating media of limited cohesion. The final chapter gives a systematic account of the mechanics of highly dispersed soils, commonly called clays.

#### *Transit Development in Rock Mechanics* - Meifeng Cai 2014-10-20

Transit Development in Rock Mechanics—Recognition, Thinking and Innovation contains 150 papers presented at the 3rd ISRM International Young Scholars' Symposium on Rock Mechanics (8-10 November 2014, Xi'an, China). The volume focusses on the transitional development in rock mechanics research from surface to underground mining and from shallow to a deep rock excavations, and on the transition of knowledge, thinking and innovation from pioneers to the young generation. The contributions cover a wide range of topics: Field investigation and measurements Physical and mechanical properties of rocks Analysis and design methods for rock engineering Numerical and physical modeling Multi-fields coupling analysis methods Rock slope, tunnel and foundation engineering Monitoring and control of rock pressure in underground engineering Dynamic rock mechanics and blasting Support and reinforcement techniques for geotechnical engineering Prediction and control of artificial hazards with excavation in rock Transit Development in Rock Mechanics—Recognition, Thinking and Innovation will be invaluable to engineers and academics interested or involved in rock mechanics, geotechnical engineering, mine engineering and underground engineering. The Symposium was organized by the Commission on Education of International Society for Rock Mechanics and Xi'an University of Science and Technology, and sponsored by the International Society for Rock Mechanics (ISRM) and the Chinese Society for Rock Mechanics and Engineering (CSRME).

#### **Rock Mechanics and Engineering Volume 2** - Xia-Ting Feng 2017-07-12

Laboratory and Field Testing is the second volume of the five-volume set Rock Mechanics and Engineering and contains nineteen chapters from key experts in the following fields: - Triaxial or True-triaxial Tests under Condition of Loading and Unloading; - Joint Tests; - Dynamic and Creep Tests; - Physical Modeling Tests; - Field Testing and URLs. The five-volume set "Comprehensive Rock Engineering", which was published in 1993, has had an important influence on the development of rock mechanics and rock engineering. Significant and extensive advances and achievements in these fields over the last 20 years now justify the publishing of a comparable, new compilation. Rock Mechanics and Engineering represents a highly prestigious, multi-volume work edited by Professor Xia-Ting Feng, with the editorial advice of Professor John A. Hudson. This new compilation offers an extremely wideranging and comprehensive overview of the state-of-the-art in rock mechanics and rock engineering and is composed of peer-reviewed, dedicated contributions by all the key experts worldwide. Key features of this set are that it provides a systematic, global summary of new developments in rock mechanics and rock engineering practices as well as looking ahead to future developments in the fields. Contributors are worldrenowned experts in the fields of rock mechanics and rock engineering, though younger, talented researchers have also been included. The individual volumes cover an extremely wide array of topics grouped under five overarching themes: Principles (Vol. 1), Laboratory and Field Testing (Vol. 2), Analysis, Modelling and Design (Vol. 3), Excavation, Support and Monitoring (Vol. 4) and Surface and Underground Projects (Vol. 5). This multi-

volume work sets a new standard for rock mechanics and engineering compendia and will be the go-to resource for all engineering professionals and academics involved in rock mechanics and engineering for years to come.

**Rock Mechanics and Rock Engineering** - Ömer Aydan 2019-12-19

The two-volume set *Rock Mechanics and Rock Engineering* is concerned with the application of the principles of mechanics to physical, chemical and electro-magnetic processes in the upper-most layers of the earth and the design and construction of the rock structures associated with civil engineering and exploitation or extraction of natural resources in mining and petroleum engineering. Volume 2, *Applications of Rock Mechanics - Rock Engineering*, discusses the applications of rock mechanics to engineering structures in/on rock, rock excavation techniques and in-situ monitoring techniques, giving some specific examples. The dynamic aspects associated with the science of earthquakes and their effect on rock structures, and the characteristics of vibrations induced by machinery, blasting and impacts as well as measuring techniques are described. Furthermore, the degradation and maintenance processes in rock engineering are explained. *Rock Mechanics and Rock Engineering* is intended to be a fundamental resource for younger generations and newcomers and a reference book for experts specialized in *Rock Mechanics and Rock Engineering* and associated with the fields of mining, civil and petroleum engineering, engineering geology, and/or specialized in Geophysics and concerned with earthquake science and engineering.

*Rock Mechanics and Engineering* - Helin Fu 2020-12-08

*Rock Mechanics and Engineering: Prediction and Control of Landslides and Geological Disasters* presents the state-of-the-art in monitoring and forecasting geotechnical hazards during the survey and design, construction, and operation of a railway. This volume offers the latest research and practical knowledge on the regularity of disaster-causing activities, and the monitoring and forecasting of rockfalls, landslides, and debris flow induced by rainfall and human activity. The book gives guidance on how to optimize railway design, prevent and control measures during construction, and geological hazard remediation. The book also advises engineers on how to achieve traffic safety on high-speed railways. Eleven chapters present best practices in the prediction and control of landslides and rockfalls in geological disasters, derived from years of geotechnical engineering research and practice on high-speed railways in China. High-speed railways bring characteristic geotechnical challenges including a complete maintenance system, a long railway line, and the subjection of the geological body to cyclic loads. Since the damage to the geological body is influenced by fatigue as well as rock and soil strength and hydrology, the study of geotechnical hazards to high-speed rail is very complex. Monitoring and predicting such hazards on high-speed railways is a significant challenge to their safe construction and operation. Presents the latest technical achievement and development trends in landslide and rockfall forecasting Considers the challenges of high-speed railways to the prediction and control of geotechnical hazards Gives both in-situ and laboratory tests for rockfalls, and considers the collapse process of rock slopes Describes the principles of slope monitoring with specific reference to high-speed rail Details an automatic monitoring system for geotechnical hazards to high-speed rail

**Rock Mechanics and Engineering** - C. Jaeger 2009-03-19

The first edition of *Rock Mechanics and Engineering* bridged the gap between scientific research on rock mechanics and practical engineering. It was resolutely aimed at giving practical information to geologists, engineering geologists and engineers. Emphasis was placed on the lessons to be learnt from the study of case histories, with the Malpasset Dam rupture and the large Vajont rock slide amongst those described. In this second, enlarged edition the author continues to emphasise aspects of rock mechanics. Modern efforts at establishing an engineering classification of rocks are summarised and considerable attention is given to the Austrian tunnelling method. Firm in his belief that there is no better way to study the subject than by the detailed analysis of case histories, Dr Jaeger has incorporated a number of new ones, for example the discussion on the engineering classification of jointed rock masses and the required rock support is illustrated by descriptions of the second Gotthard Tunnel and the design of the third, much larger tunnel.

*Practical Rock Mechanics* - Steve Hencher 2015-08-28

An Ideal Source for Geologists and Others with Little Background in Engineering or Mechanics Practical

*Rock Mechanics* provides an introduction for graduate students as well as a reference guide for practicing engineering geologists and geotechnical engineers. The book considers fundamental geological processes that give rise to the nature of rock masses and control their mechanical behavior. Stresses in the earth's crust are discussed and methods of measurement and prediction explained. Ways to investigate, describe, test, and characterize rocks in the laboratory and at project scale are reviewed. The application of rock mechanics principles to the design of engineering structures including tunnels, foundations, and slopes is addressed. The book is illustrated throughout with simple figures and photographs, and important concepts are illustrated by modern case examples. Mathematical equations are kept to the minimum necessary and are explained fully—the book leans towards practice rather than theory. This text: Addresses the principles of rock mechanics as it applies to both structural geology and engineering practice Demonstrates the importance of and methods of geological characterisation to rock engineering Examines the standard methods of rock mechanics testing and measurement as well as interpretation of data in practice Explains connections between main parameters both empirically as well as on the basis of scientific theory Provides examples of the practice of rock mechanics to major engineering projects Practical Rock Mechanics teaches from first principles and aids readers' understanding of the concepts of stress and stress transformation and the practical application of rock mechanics theory. This text can help ensure that ground models and designs are correct, realistic, and produced cost-effectively.

**Rock Engineering Design** - Harsha Vardhan 2013-08-28

Being knowledgeable about rock properties is vital to being effective in the design of blasts in mines, quarries and other construction projects. Without proper knowledge, the energy released during blasting can be underutilized, harm the environment, and may escalate costs. *Rock Engineering Design: Properties and Applications of Sound Level* aids scientists and practicing engineers in determining rock properties in a quick and precise way. It presents the basic concepts and principles on which sound level can be used in solving rock engineering design problems. Highlighting the importance of sound level in determining rock properties, the book focuses on the indirect method with emphasis on the development of numerical models in rock engineering design. Discusses determining rock property using sound levels produced during drilling Explores the benefits of effective rock design applications Helps students to develop an interest in using sound level as a tool in rock design applications The book provides a general introduction to noise, its effect, and standards. It discusses the application of noise monitoring for mining equipment, the application of acoustic emission techniques in geotechnical fields, the equipment for drilling, measurement of sound, and the physico-mechanical properties of rocks. It also explores the process involved in the measurement of rock properties and sound level. This book summarizes in tables and figures the statistical values of the rock properties and sound level produced during the drilling of different rocks. It explains developed regression models, procedure, and the results of developed artificial neural network models. *Rock Engineering Design: Properties and Applications of Sound Level* includes a case study, and offers a summary and suggestions for further work.

*Engineering in Rocks for Slopes, Foundations and Tunnels* - T. Ramamurthy 2010

"With the ever increasing developmental activities as diverse as the construction of dams, roads, tunnels, underground powerhouses and storage facilities, petroleum exploration and nuclear repositories, a more comprehensive and updated understanding of rock mass is essential for civil engineers, engineering geologists, geophysicists, and petroleum and mining engineers. Though some contents of this vast subject are included in undergraduate curriculum, there are full-fledged courses on *Rock Mechanics/Rock Engineering* in postgraduate programmes in civil engineering and mining engineering. Much of the material presented in this book is also taught to geology and geophysics students. In addition, the book is suitable for short courses conducted for teachers, practising engineers and engineering geologists." -- Back cover.

*Rock Mechanics and Rock Engineering* - Ömer Aydan 2019-12-06

The two-volume set *Rock Mechanics and Rock Engineering* is concerned with the application of the principles of mechanics to physical, chemical and electro-magnetic processes in the upper-most layers of the earth and the design and construction of the rock structures associated with civil engineering and exploitation or extraction of natural resources in mining and petroleum engineering. Volume 1,

Fundamentals of Rock Mechanics, discusses rock-constituting elements, discontinuities and their behavior under various physical and chemical actions in nature. The governing equations together with constitutive laws and experimental techniques and the solution techniques are explained and some examples of applications are given. A number of chapters are devoted to possible new directions in rock mechanics. Rock Mechanics and Rock Engineering is intended to be a fundamental resource for younger generations and newcomers and a reference book for experts specialized in Rock Mechanics and Rock Engineering and associated with the fields of mining, civil and petroleum engineering, engineering geology, and/or specialized in Geophysics and concerned with earthquake science and engineering.

*Engineering Rock Mechanics* - John A Hudson 2000-06-12

Engineering rock mechanics is the discipline used to design structures built in rock. These structures encompass building foundations, dams, slopes, shafts, tunnels, caverns, hydroelectric schemes, mines, radioactive waste repositories and geothermal energy projects: in short, any structure built on or in a rock mass. Despite the variety of projects that use rock engineering, the principles remain the same. Engineering Rock Mechanics clearly and systematically explains the key principles behind rock engineering. The book covers the basic rock mechanics principles; how to study the interactions between these principles and a discussion on the fundamentals of excavation and support and the application of these in the design of surface and underground structures. Engineering Rock Mechanics is recommended as an across-the-board source of information for the benefit of anyone involved in rock mechanics and rock engineering.

*Rock Mechanics and Engineering Volume 5* - Xia-Ting Feng 2017-07-20

Surface and Underground Projects is the last volume of the five-volume set Rock Mechanics and Engineering and contains twenty-one chapters from key experts in the following fields: - Slopes; - Tunnels and Caverns; - Mining; - Petroleum Engineering; - Thermo-/Hydro-Mechanics in Gas Storage, Loading and Radioactive Waste Disposal. The five-volume set "Comprehensive Rock Engineering", which was published in 1993, has had an important influence on the development of rock mechanics and rock engineering. Significant and extensive advances and achievements in these fields over the last 20 years now justify the publishing of a comparable, new compilation. Rock Mechanics and Engineering represents a highly prestigious, multi-volume work edited by Professor Xia-Ting Feng, with the editorial advice of Professor John A. Hudson. This new compilation offers an extremely wideranging and comprehensive overview of the state-of-the-art in rock mechanics and rock engineering and is composed of peer-reviewed, dedicated contributions by all the key experts worldwide. Key features of this set are that it provides a systematic, global summary of new developments in rock mechanics and rock engineering practices as well as looking ahead to future developments in the fields. Contributors are worldrenowned experts in the fields of rock mechanics and rock engineering, though younger, talented researchers have also been included. The individual volumes cover an extremely wide array of topics grouped under five overarching themes: Principles (Vol. 1), Laboratory and Field Testing (Vol. 2), Analysis, Modelling and Design (Vol. 3), Excavation, Support and Monitoring (Vol. 4) and Surface and Underground Projects (Vol. 5). This multi-volume work sets a new standard for rock mechanics and engineering compendia and will be the go-to resource for all engineering professionals and academics involved in rock mechanics and engineering for years to come.

**Rock Mechanics** - Barry H.G. Brady 2013-06-29

This new edition has been completely revised to reflect the notable innovations in mining engineering and the remarkable developments in the science of rock mechanics and the practice of rock engineering that have taken place over the last two decades. Although "Rock Mechanics for Underground Mining" addresses many of the rock mechanics issues that arise in underground mining engineering, it is not a text exclusively for mining applications. Based on extensive professional research and teaching experience, this book will provide an authoritative and comprehensive text for final year undergraduates and commencing postgraduate students. For professional practitioners, not only will it be of interests to mining and geological engineers, but also to civil engineers, structural mining geologists and geophysicists as a standard work for professional reference purposes.

**Rock Mechanics and Rock Engineering** - Ömer Aydan 2019-12-18

The two-volume set Rock Mechanics and Rock Engineering is concerned with the application of the principles of mechanics to physical, chemical and electro-magnetic processes in the upper-most layers of the earth and the design and construction of the rock structures associated with civil engineering and exploitation or extraction of natural resources in mining and petroleum engineering. Volume 1, Fundamentals of Rock Mechanics, discusses rock-constituting elements, discontinuities and their behavior under various physical and chemical actions in nature. The governing equations together with constitutive laws and experimental techniques and the solution techniques are explained and some examples of applications are given. A number of chapters are devoted to possible new directions in rock mechanics. Rock Mechanics and Rock Engineering is intended to be a fundamental resource for younger generations and newcomers and a reference book for experts specialized in Rock Mechanics and Rock Engineering and associated with the fields of mining, civil and petroleum engineering, engineering geology, and/or specialized in Geophysics and concerned with earthquake science and engineering.

Rock Mechanics on a Geological Base - R. Pusch 1995-04-07

Until a few years ago, hydropower, road tunneling and mining were the main fields interested in rock mechanics. Now, however, rock mechanics is becoming increasingly important in many more branches - the most significant globally being the disposal of hazardous, especially radioactive, waste in deeply located repositories. This has raised a number of new aspects on the mechanical behaviour of large rock masses hosting repositories and of smaller rock elements forming the nearfield of tunnels and boreholes with waste containers. The geological background and above all rock structure form the basis of this book. The structural scheme proposed is referred to explain the scale-dependent behaviour of rock. Thus, the reason for differences in strength and strain properties of different types and volumes of rocks is shown in a very clear fashion, using simple material models and very basic numerical models. The author's academic background in both geology and soil and rock mechanics and his long experience in practical design and construction work has led to an unusually pedagogic way of dealing with the subject. The book is intended for use by consultants in engineering geology and waste disposal and by students of these subjects. However, engineers and geologists with a limited background in stress/strain and fracture theory and computer-based calculation methods will also find the book attractive.

**Rock Mechanics in Engineering Practice** - Kenneth Geoffrey Stagg 1975

**Rock Mechanics and Engineering Geology in Volcanic Fields** - Takehiro Ohta 2022-09-22

Rock Mechanics and Engineering Geology in Volcanic Fields includes keynote lectures and papers from the 5th International Workshop on Rock Mechanics and Engineering Geology in Volcanic Fields (RMEGV2021, Fukuoka, Japan, 9-10 September 2021). This book deals with challenging studies related to solving engineering issues around volcanic fields, including: Volcanic geology, disasters and their mitigation Resources and energy in volcanic fields Mechanical behavior of volcanic rocks and soils Groundwater and environmental problems in volcanic fields Geotechnical engineering in volcanic fields Rock Mechanics and Engineering Geology in Volcanic Fields is of great interest to civil engineers and engineering geologists working in the areas of rock and soil mechanics, geotechnical engineering, geothermal energy, engineering geology, and environmental science.

**Rock Mechanics and Engineering Geology in Volcanic Fields** - Takehiro Ohta 2022-10-27

Rock Mechanics and Engineering Geology in Volcanic Fields includes keynote lectures and papers from the 5th International Workshop on Rock Mechanics and Engineering Geology in Volcanic Fields (RMEGV2021, Fukuoka, Japan, 9-10 September 2021). This book deals with challenging studies related to solving engineering issues around volcanic fields, including: Volcanic geology, disasters and their mitigation Resources and energy in volcanic fields Mechanical behavior of volcanic rocks and soils Groundwater and environmental problems in volcanic fields Geotechnical engineering in volcanic fields Rock Mechanics and Engineering Geology in Volcanic Fields is of great interest to civil engineers and engineering geologists working in the areas of rock and soil mechanics, geotechnical engineering, geothermal energy, engineering geology, and environmental science.

*Rock Mechanics and Engineering, 5 Volume Set* - Xia-Ting Feng 2016-09-01

The five-volume set "Comprehensive Rock Engineering," which was published in 1993, has had an

important influence on the development of rock mechanics and rock engineering. Significant and extensive advances and achievements in these fields over the last 20 years now justify the publishing of a comparable, new compilation. Rock Mechanics and Engineering represents a highly prestigious, multi-volume work edited by Professor Xia-Ting Feng, with the editorial advice of Professor John A. Hudson. This new compilation offers an extremely wide-ranging and comprehensive overview of the state-of-the-art in rock mechanics and rock engineering and is composed of peer-reviewed, dedicated contributions by all the key experts worldwide. Key features of this set are that it provides a systematic, global summary of new developments in rock mechanics and rock engineering practices as well as looking ahead to future

developments in the fields. Contributors are world-renowned experts in the fields of rock mechanics and rock engineering, though younger, talented researchers have also been included. The individual volumes cover an extremely wide array of topics grouped under five overarching themes: Principles (Vol. 1), Laboratory and Field Testing (Vol. 2), Analysis, Modelling and Design (Vol. 3), Excavation, Support and Monitoring (Vol. 4) and Surface and Underground Projects (Vol. 5). This multi-volume work sets a new standard for rock mechanics and engineering compendia and will be the go-to resource for all engineering professionals and academics involved in rock mechanics and engineering for years to come.